Name: Date:

Exam: Function Reflections (Solution version 18)

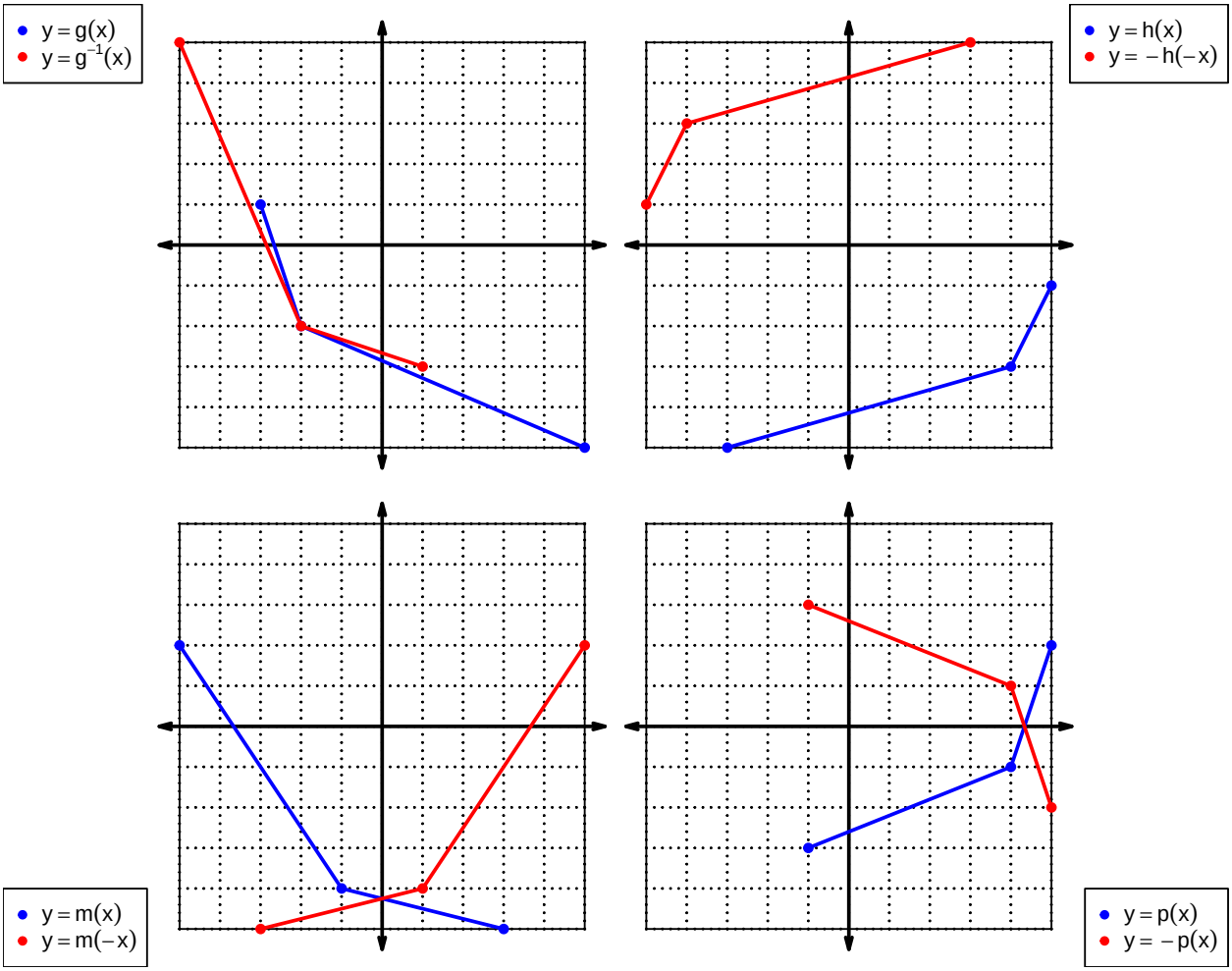
1. Let function f be defined by the polynomial below:

$$f(x) = 9x^5 - 2x^4 + 5x^3 - 3x^2 + 6x + 8$$

Draw lines that match each function reflection with its polynomial:

Reflections	Polynomials
$f(-x)$	$-9x^5 - 2x^4 - 5x^3 - 3x^2 - 6x + 8$
$-f(x)$	$-9x^5 + 2x^4 - 5x^3 + 3x^2 - 6x - 8$
$-f(-x)$	$9x^5 + 2x^4 + 5x^3 + 3x^2 + 6x - 8$

2. In each xy plane shown below, a function is graphed with blue. Draw the indicated reflections (as a second curve, indicated in legend) with black (or with whatever you have). The x axis is horizontal and the y axis is vertical (as typical), and the scale is equal on both axes.



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For all questions on this page, the functions f, g, and h are defined by the table below.

x	$f(x)$	$g(x)$	$h(x)$
1	6	2	8
2	7	4	9
3	3	5	1
4	1	7	2
5	2	9	7
6	9	3	6
7	8	1	5
8	5	6	4
9	4	8	3

3. Evaluate $f(9)$.

$$f(9) = 4$$

4. Evaluate $g^{-1}(1)$.

$$g^{-1}(1) = 7$$

5. By filling more rows of the table, it is possible to make function g **odd**. If that were done, what would be the value of $g(-3)$?

If function g is odd, then

$$g(-3) = -5$$

6. By filling more rows of the table, it is possible to make function h **even**. If that were done, what would be the value of $h(-8)$?

If function h is even, then

$$h(-8) = 4$$

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7. A function, f, is **even** if $f(x) = f(-x)$ for all x in the domain. A function, g, is **odd** if $g(x) = -g(-x)$ for all x in the domain.
   Let polynomial p be defined with the following equation:

$$p(x) = -x^3 - 1$$

   a. Express $p(-x)$ as a polynomial in standard form.

$$p(-x) = -(-x)^3 - 1$$
$$p(-x) = x^3 - 1$$

   b. Express $-p(-x)$ as a polynomial in standard form.

$$-p(-x) = -\left(x^3 - 1\right)$$
$$-p(-x) = -x^3 + 1$$

   c. Is polynomial p even, odd, or neither?

   neither

   d. Explain how you know the answer to part c.

   We see that $p(x)$ is not equivalent to either $p(-x)$ or $-p(-x)$, so p is neither even nor odd.

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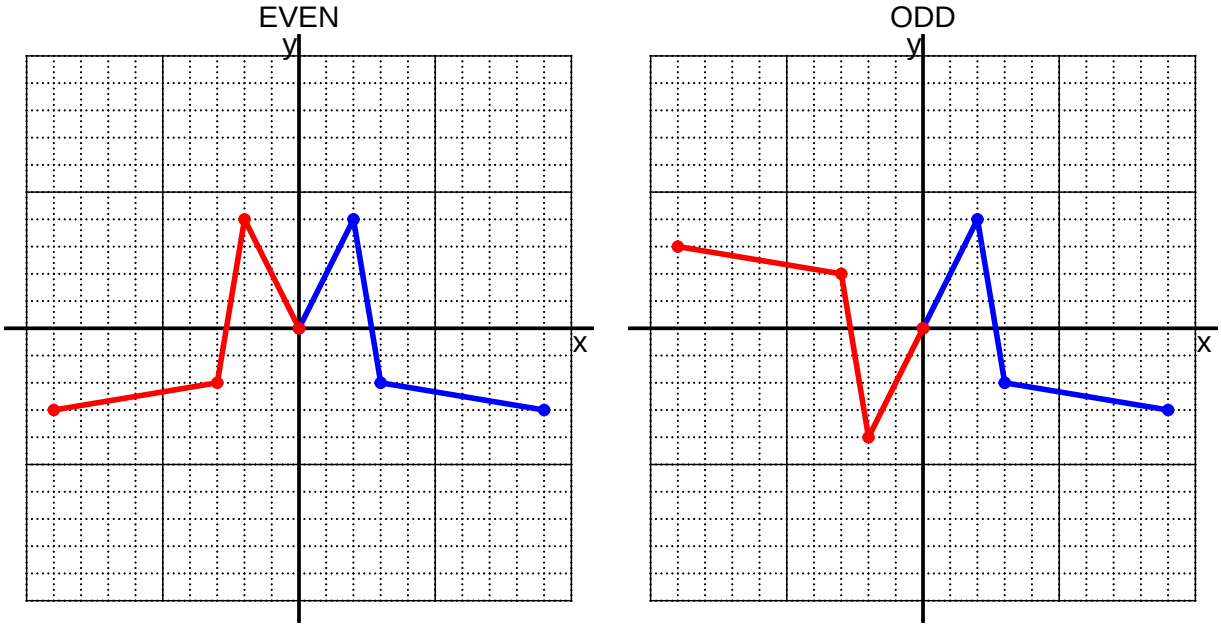
8. I have drawn half of a function. Draw the other half to make it even or odd.



9. Let function f be defined with the equation below.

$$f(x) = \frac{x}{4} - 6$$

a. Evaluate $f(84)$.

step 1: divide by 4
step 2: subtract 6

$$f(84) = \frac{(84)}{4} - 6$$
$$f(84) = 15$$

b. Evaluate $f^{-1}(10)$.

step 1: add 6
step 2: multiply by 4

$$f^{-1}(x) = 4(x+6)$$
$$f^{-1}(10) = 4((10)+6)$$
$$f^{-1}(10) = 64$$

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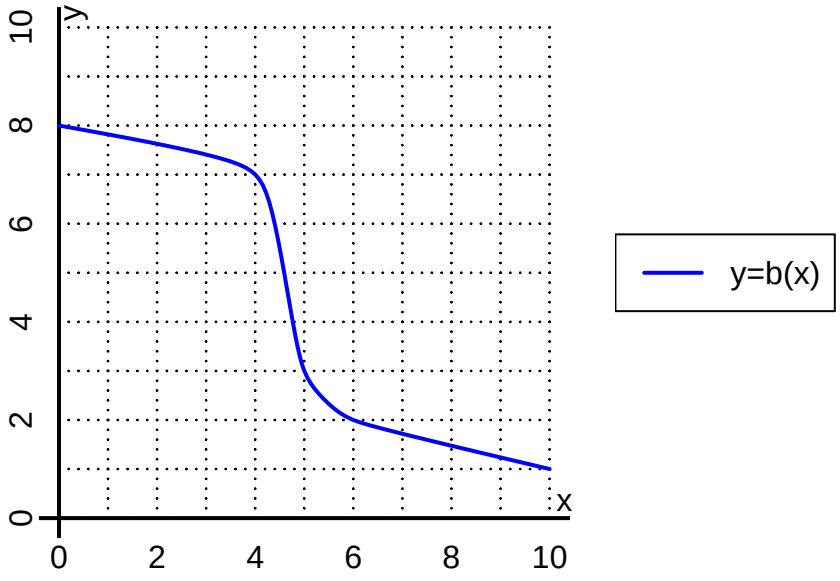
10. The function b is represented by the curve $y = b(x)$ graphed below.



a. Evaluate $b(6)$.

$b(6) = 2$

b. Evaluate $b^{-1}(3)$.

$b^{-1}(3) = 5$

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11. Function f is defined by the table below.

    a. Complete the columns for $-f(x)$ and $f(-x)$ and $-f(-x)$.

x	$f(x)$	$-f(x)$	$f(-x)$	$-f(-x)$
-2	-4	4	4	-4
-1	5	-5	-5	5
0	0	0	0	0
1	-5	5	5	-5
2	4	-4	-4	4

b. Is function f even, odd, or neither?

odd

c. How do you know the answer to part b?

Function f is odd because column $-f(-x)$ matches column $f(x)$ exactly.